CRITICAL SUCCESS FACTORS AFFECTING SUSTAINABILITY OF OIL AND GAS PRODUCTION IN NIGER DELTA, NIGERIA

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Abstract: Niger Delta region hosts major Oil and Gas operations in Nigeria. Niger Delta was recently declared dangerous region because of criminalities, kidnappings, killings and human right issues. Niger Delta communities violently stood against oil and gas operations after accusation of long term neglect and underdevelopment. Oil companies became target by heavily armed *militants*. World energy supply had been grossly affected.

It therefore became imperative to evaluate sustainable rural development contributions of Multinational oil and gas corporations in the Niger Delta. Main objective was identification of critical success factors of sustainability.

Analysis, results and recommendations are contained in this paper as contributions to sustainable world energy availability strategy.

The survey was exploratory. Sampling strategy was combination of probability, purposive and clustering. Data collection was through questionnaire, interview, focused group discussion and reviewed literature. Analytical tool was multiple regression analysis.

Results revealed core sustainability indices as Acceptability, Functionality, Operability and Durability of interventions through *discovery of participation model of RACI*. Additional results showed carriers of development information, inbuilt operations and maintenance philosophy, completion of projects, quality of life, stakeholders' engagement method and method of programme execution were significant to sustainability at 5%. *The research developed a new model called "Spider model of rural development"* where methods of selecting interventions and capacity development through Employment were significant at 1%. Environmental unfriendliness and ill- focused programmes had negative relationship.

Recommendations included rural development policy for Niger Delta region based on Spider model, broad based MOU, intensified stakeholders' engagement, participatory approach of RACI model, gender as policy mandate for oil and gas multinationals, deliberate economic empowerment and Joint venture partners' periodic meetings on Niger Delta development issues.

Keywords: Participation model of RACI (Responsibility, Accountability, Consultations and Information), Sustainability model of AFOD (Acceptability, Functionality, Operability and Durability), Spider model of development, Sustainability of global energy availability and price.

I. INTRODUCTION

The main source of Nigerian economy is hydrocarbon basically oil and gas. Down stream oil production had gained prominence in Nigeria till recent time when the oil and gas companies started diversification to gas production. The gas reserve in Nigeria was so much that satisfaction of domestic market and other local needs will not affect external commitments.

However, the production of oil and gas in Nigeria had met several obstacles. These obstacles were not technological nor were they market oriented. They were obstacles that could affect commitments by Federal Republic of Nigeria. The oil and gas production could no longer be produced smoothly to meet demands both locally and internationally.

The corporate social responsibilities of the oil and gas companies could no longer guarantee sustained license to operate. However, the demand for oil and gas were at the increase. The oil and gas multinational corporations were involved in rural communities' development outside their core mandate of exploration and production of hydrocarbons just to showcase presence.

Unfortunately, the communities in the Niger Delta swiftly shifted attention from making development demands from Nigerian government (local, State and Federal) to the multinational oil and gas corporations. Accusations were thrown on the industries over long time gross neglect, marginalization, and deprivations among others. The multinationals in their stride to meet world energy demand, started implementing some rural development programmes. The major key areas of focus were

- Infrastructure
- Economic empowerment
- Human capital development
- Health services

The performance of major oil and gas exploration and production companies in Nigeria were assessed in the eyes of Nigerians and indeed the Niger Deltans from the ability to meet above demand that had been entrenched as obligations.

The multinationals had rough times trying to find their feet. Militancy and criminal activities became the other of the day. Hostage taking, Kidnapping, killings and destruction of oil and gas facilities became a daily occurrence. However, the demand for energy was at the increase occasioned by Middle East crisis and siege against Iran and Iraq. The oil prices soared high. It became imperative therefore to evaluate the factors that could affect the sustainability of oil and gas production in the Niger Delta.

It could be concluded that technological advancement associated with exploration and production of hydrocarbons had not threatened its sustainability to ensure constant supply. Research and development studies in this regard had churned out technologies that were efficient – 2 dimensional seismic to 3-dimentional; vertical drilling to horizontal drilling and clustered drilling among others. What had continuously imposed a problem was the dynamics of the operating environment.

A critical sustainability factor uncovered in Nigerian oil and gas exploration and production was the social engineering. In Nigeria and indeed the Niger Delta, the human psyche needs serious re-engineering if the sustainability of oil and gas exploration and production will be sustained. Canalization of oil production equipment thereby causing oil spill and its attendant consequences will need to be addressed.

Corporate social responsibility (CSR) had been identified as critical success factor of oil and gas production. However, there could be some critical factors that could affect the CSR associated with oil and gas production in the Nigerian Niger Delta. This was predicated on the fact that Nigeria was a developing nation with very high population density that concentrated more in the rural areas. Thus, the development of the rural communities that accommodated the oil and gas needed to be of priority in order to meet world energy demand. Thus, the factors that threaten peaceful environment in the Nigerian Niger Delta were as important as exploration and production of oil and gas itself.

Therefore, this paper concentrated on the critical success factors of corporate social responsibilities that had the potentials of affecting exploration and production of oil and gas in Nigeria, thereby affecting her commitments towards global energy and by implication the gyration of prices of oil and gas in the world energy market.

In summary, the world energy price is a function of availability and an index of sustainability of oil and gas. To curtail the gyration of energy prices, the operating environment (physical and social) will need to be secured. In the Niger Delta region of Nigeria which is the bedrock of oil and gas production, CSR had been discovered as key towards taming the militants who carry arms because of abject poverty and hunger in the midst of God-given wealth.

Therefore, the objective of the study was to identify critical factors affecting sustainability of oil and gas production in the Niger Delta region of Nigeria with an attempt to relatively stabilizing global energy price as determined by market forces.
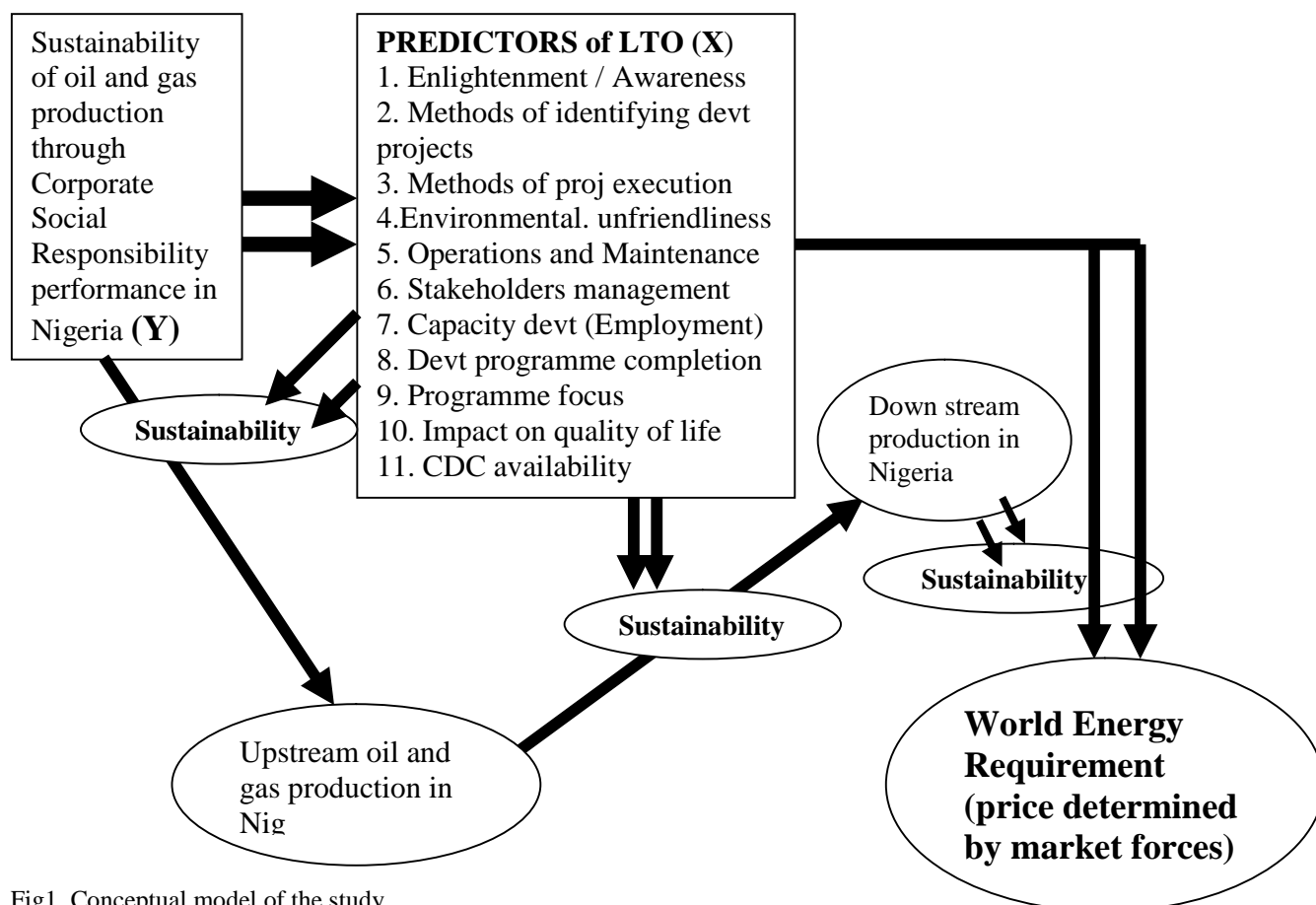
The study was conceptualized thus;

Fig1. Conceptual model of the study

II. RESEARCH METHODOLOGY

2.1 Scope and sampling
Scope
The scope of the study was the Niger Delta region of Nigeria. As stated earlier, the Niger Delta region is the home of oil and gas exploration and production in Nigeria. Politically, the region cuts across nine (9) states. The states were;

1. Abia
2. Akwa Ibom
3. Bayelsa
4. Cross River
5. Delta
6. Edo
7. Imo
8. Ondo and
9. Rivers

However, in Nigeria, Akwa Ibom, Bayelsa, Cross River, Delta, Edo and Rivers states claim to be the core Niger Delta. An issue that is constantly been debated. The act of oil and gas production and its associated criminalities take place in Bayelsa, Delta and Rivers. The oil and gas criminal related activities are bunkering, kidnappings, human right abuse issues, environmental destruction among others.

It had witnessed many crisis situations such as communal conflict and militancy that had caused the region to be dreaded in Nigeria especially among the multinational oil and gas industries, hence the declaration of the region as dangerous zone.

The target population of the study was all beneficiaries of oil and gas corporate social responsibilities (CSR) in Rivers and Bayelsa states of Nigeria. These included heads of households and community leaders / representatives, women, youths and indeed all community members that benefit from multinational oil and gas rural development interventions.

Current issues surrounding the quest and agitation for Niger Delta development informed the purposive selection of Rivers and Bayelsa states for the study.

In recent times, there was relatively high degree of restiveness in the oil rich Niger Delta that attracted international communities' attention.

According to SPDC (unpublished) [1], it is the biggest and oldest company operating in the Niger Delta and had promoted agricultural development (among others) to improve standard and quality of life of the communities. Similarly, Total Exploration and Production (TEPNG) and Nigerian Agip Oil Company (NAOC) are also operating in the same region and in most cases very close to each other. This nearness had caused some difficulties in negotiations for rural development interventions between the multinational oil and gas companies and the communities in the region.

Sampling techniques

The survey was exploratory (breaking new grounds) in nature and sampling strategy was a combination of probability and purposive.

Another strategy was clustered and random sampling. The oil and gas companies had already clustered the communities where they operate in the Niger Delta into oil fields.

A total of 2 oil fields each were randomly selected from SPDC, TEPNG and NAOC for the study. From the oil fields, 4 communities were selected while a total of 12 persons were randomly selected from the communities' based organizations (Chiefs / Elders, CDC, Women and Youth). Therefore, a total of 96 persons in each of the communities where the multinationals under review operated were selected as respondents. A grand total of 288 respondents were issued with questionnaires in this study as shown in Table 1. A total of 252 (87.5%) of the questionnaires were retrieved upon which analysis and conclusions were drawn.

Focused Group Discussion (FGD) was used to obtain communities' opinions while prominent community leaders and arrow heads for sustainable community development for the multinational oil and gas industries were interviewed. It was discovered that a common social structure existed in all communities where the multinationals operated. The social structure was Chiefs / Elders, Communities' Development Committees, Youths and women groups. It was against this discovery that the questionnaire for the study was administered accordingly as shown in Table 1.

2.2 Data Collection and Instrument

The following instruments were used for data collection;

- Questionnaire
- Semi Structured Interview (SSI)
- Focused Group Discussion (FGD)
- Available / relevant literature and
- Researchers' personal experience in the oil and gas industries and the Niger Delta operating environments were of great assistance.

The analytical techniques and model used was the multiple regression and simple descriptive statistics where percentages, pie charts, figures and tables were used to present results.

The regression model was used to determine the relationship between the predictors (independent variables) **- X** and the dependent variable which is sustainability of oil and gas activities in the Niger Delta viewed from the performance of CSR **- Y**. The criticality of the predictor variables to sustainability issues in the Niger Delta was addressed. However, discussions of the result were based on Exponential function since it gave the best fit considering levels of significance and data obtained during FGD.

The study was limited by scope based on design, finance as a result of highly monetized environment of the Niger Delta, the relationship between the multinational oil and gas industries and their host communities and finally by security sensitivities as hostage taking and warring groups to control the region raged high during the period of study.

Table 1
Table 1 Study Area and the Sampling Unit (Population)

Multinational oil corporations	Oil Fields	Communities	LGA	State	Respondents					
					Chiefs/Elders	CDC	Youths	Women	Total	Retrv
NAOC(b1)	Obama	Dorgu Ewoma	Okoroma/Tereke (Nembe LGA)	Bayelsa	3	3	3	3	12	12
		Eminiama			3	3	3	3	12	10
		Akakumama/Okoroma			3	3	3	3	12	11
		Ologoama			3	3	3	3	12	11
NAOC(b2)	Ebocha	Omoku		Rivers	3	3	3	3	12	12
		Obirikom			3	3	3	3	12	12
		Okwuzi			3	3	3	3	12	10
		Ebocha			3	3	3	3	12	12
SPDC(a1)	Gbarain	Ogboloma	Gbaran-Ekpetieama	Bayelsa	3	3	3	3	12	12
		Gbarantoru			3	3	3	3	12	12
		Koroama			3	3	3	3	12	12
	Elebele Cawt	Akenfa	Yenagoa	Bayelsa	3	3	3	3	12	7
SPDC(a2)	Channel	Abonnema	AKULGA	Rivers	3	3	3	3	12	11
		Abalama	AKULGA		3	3	3	3	12	12
		Bakana	AKULGA		3	3	3	3	12	6
		Buguma	DELGA		3	3	3	3	12	11
ELF(c1)	Obagi	Egi	Onelga	Rivers	3	3	3	3	12	12
		Idu	Onelga		3	3	3	3	12	12
		Amah	Onelga		3	3	3	3	12	10
		Ekpeye	Ah West		3	3	3	3	12	11
ELF(c2)	Olo	Okinali	Ikwerre	Rivers	4	4	4	4	12	12
		Rumuekpe	Emulga		4	4	4	4	12	10
		Alimini	Emulga		4	4	4	4	12	12
									288	**252**

Source: Field data 2005

III. ANALYSIS AND RESULTS

3.1 FACTORS EFFECTING SUSTIANABILITY OF OIL AND GAS PROUCTION IN THE NIGERIAN NIGER DELTA REGION

Many predictor (independent) variables were identified in the course of this study to affect sustainability of oil and gas production in the Niger Delta. However, eleven (11) of them were considered. The pool of independent variables (X) was a function of perceived impact on Y (dependent variable) that was measured by the identified key sustainability indices of CSR of multinational oil and gas industries – Acceptability, Functionality, Operability and Durability (AFOD) as opined by Ogueri (unpublished) [2].

The foregoing discussions can be represented in this simple multiple regression equation:

$$Y=f(a_1X_1+a_2X_2+a_3X_3+a_4X_4+a_5X_5+a_6X_6+a_7X_7+a_8X_8+a_9X_9+a_{10}X_{10}+a_{11}X_{11}+ X_e)-----(eqn\ 1)$$

Where
Y = Sustainability of Oil and Gas production in Niger Delta (definition based on Acceptability, Functionality, Operability and Durability – AFOD of multinationals CSR)
X_1 = Info Enlightenment / Awareness source
X_2 = Environmental Unfriendliness of programmes
X_3 = Operations & Maintenance philosophy
X_4 = Programme completion
X_5 = Method of selecting development programmes
X_6 = Impact on quality of live

X7 = Stakeholders Engagement- Quality, Timing & Frequency

X8 = Availability of development group in the community (CDC)

X9 = Employment thru Capacity devt - No of people employed by CSR programmes

X10 = Execution methods

X11 = Programme focus

Xe = error term

a1- a11 = Constant

In addition, the study also explored the effect of other variables (the socio-economic factors) on the sustainability of rural development programmes in the Niger Delta. However, these were not considered critical factors; hence they were not discussed in this paper.

The equation expressed the assumption that Sustainability of oil and gas production in the Niger Delta (AFOD) is a function of Methods of identification, selection and execution of programmes, programme awareness and enlightenment sources and focus, consultations and Employment generation through capacity development, environment unfriendliness, completion, operations and maintenance philosophy and impact on quality of live.

It was also discovered that there were also some *intervening variables* that affect sustainability of rural development programmes in the Niger Delta environment These included Government interests / policies, Communal conflict, CSR budgets of the multinational oil and gas industries, Cash-call, Natural disasters (floods etc), Effective communication, 'Political games' and Functions / characteristics of government agencies performing same rural development functions.

These intervening variables possess the potentials to affect sustainability or effectiveness of rural development programmes in the Niger Delta region of Nigeria.

When the negative sides of these intervening variables were considered, they inhibit sustainability, otherwise they strengthen sustainability.

The intervening variables and socio-economic factors were kept constant in this paper while the aforementioned 11 predictor variables were fully discussed.

Strategically, the sustainability indices were weighted and summed to 21. Individual respondent scores were marched against it (cumulative score). The cumulative scores from the respondents of SPDC, NAOC and TEPNG were used to measure effectiveness and otherwise sustainability of oil and gas production in the Niger Delta based on the CSR of multinational oil and gas industries.

Comparatively, effectiveness level of oil and gas production for SPDC, NAOC and TEPNG was compared based on participation of CSR programme beneficiaries.

To ensure common understanding of the variables for the study, they were put into operational perspective. As stated earlier, there were dependent, independent and intervening (positive /negative) variables in the study. Focused Group Discussion results and environmental indicators that affect quality of live in the oil and gas bearing Niger Delta communities were also considered.

Table 2 showed results of various functional tools (Linear, Semi log, Double Log and Exponential) that were used in the analysis.

Considering the R2 and F-ratio values of linear and exponential functions that were significant at 5%, it behooves attention to these functions as best fit.

Further consideration with regard to field information obtained during data collection especially Focused Group Discussion (FGD), it was decided that discussion be based on exponential function as it gives the best fit in explaining the effect of the variables (x) or otherwise on sustainability Y.

Table 2: Determinants of sustainability

Variables	Linear	Semi log	Double log	Exponential
Constant	3.592 (0.757)	14.972 (1.920)	2.987 (2.907)	1.040 (1.840)
X1	3.296* (2.170)	5.647 ((1.702)	0.789 (1.805)	0.492 ** (2.721)
X2	- 4.202* (-2.221)	- 4.261 (- 1.808)	- 0.557 (- 1.792)	-0.576** (-2.553)
X3	6.484* (2.283)	7.586 (1.799)	1.176 (2.117)	1.022** (3.021)
X4	1.984** (2.308)	2.424 (2.540)	0.308 (2.447)	0.242** (2.362)
X5	4.592** (2.962)	5.190 (2.515)	0.717 (2.636)	0.648*** (3.508)
X6	7.542* (1.896)	8.378 (1.270)	1.353 (1.557)	1.286** (2.713)
X7	3.885** (3.305)	5.678 (2.824)	0.630 (2.377)	0.436** (3.115)
X8	1.443** (2.471)	1.326 (2.005)	0.104 (1.188)	0.118 (1.698)
X9	4.211*** (3.386)	- 3.550 (- 2.619)	- 0.482 (- 2.698)	0.607*** (4.099)
X10	2.039* (2.172)	4.395 (1.405)	0.636 (1.542)	0.320** (2.861)
X11	-11.198** (-2.594)	- 9.967 (- 1.970)	- 1.359 (- 2.038)	-1.627** (-3.162)
R2	0.852	0.818	0.785	0.857
F-ratio	4.193**	3.269*	2.648*	4.360**

NOTE:
*** = significant at 1%
** = significant at 5%
* = significant at 10%
Values in parenthesis are t-values

RESULTS

The study revealed that all sustainable CSR programmes were effective but not all effective CSR programmes were sustainable.

The critical factors of sustainability were weighted to give a total of 21 points which was considered as minimum score for sustainability and consequently effectiveness.

Table 3: SUSTAINABILITY/EFFECTIVENESS LEVELS OF CSR PROGRAMMES IN NIGER DELTA

Sustainability/Effectiveness level based on appendix	Freq (SPDC)	% (SPDC)	Freq (NAOC)	% (NAOC)	Freq (TEPNG)	% (TEPNG)	Freq (POOLED)	% (POOLED)
1 – 5	10	11.5	13	14.6	9	12.9	32	13.0
6 – 10	41	47.1	41	46.1	23	32.9	105	42.7
11 – 15	35	40.2	33	37.1	34	48.6	102	41.5
16 – 20	1	1.2	2	2.2	4	5.7	7	2.8
Total	87		89		70		246	100

Source: Field survey 2005

NOTE:

1 – 5   = Very unsustainable / very ineffective
6 – 10   = Unsustainable / Ineffective
11 – 15   = Sustainable / Effective
16 – 20   = Very sustainable / very effective

NAOC had the highest percentage (15%) of very unsustainable/very ineffective rural development programmes in the Niger Delta. This was followed by TEPNG with 13% and SPDC with 12%. On the average (pooled), 13% of Multinational Oil Corporations' CSR programmes in the Niger Delta area were very unsustainable and very ineffective.

In the case of unsustainable and ineffective, SPDC scored highest of 47% when compared to NAOC and TEPNG that scored 46% and 33% respectively. The average score for the Multinational Oil Corporations under review was 43% ineffective.

Sustainable and effective rural CSR programmes recorded 49% for TEPNG, 40% for SPDC and 37% for NAOC. The percentage pooled score stood at 42% of sustainability and effectiveness level.

In the case of very sustainable and very effective CSR programmes of the Multinational Oil Corporations, TEPNG recorded the highest with 6% against NAOC with 2% and lastly SPDC with 1%. Averagely, the Multinationals scored 3% of very sustainable and very effective CSR programmes in the Niger Delta. This was considered very poor in performance. The Niger Delta struggle can better be appreciated from this perspective.

Table 4: Sustainability/Effectiveness Status at a Glance

Multinational	Very unsustainable/ Very ineffective	Unsustainable/ Ineffective	Sustainable/ Effective	Very sustainable/ very Effective
SPDC	12%	47%	40%	1%
NAOC	15%	46%	37%	2%
TEPNG	13%	33%	49%	6%
Average (Pool)	13%	43%	42%	3%

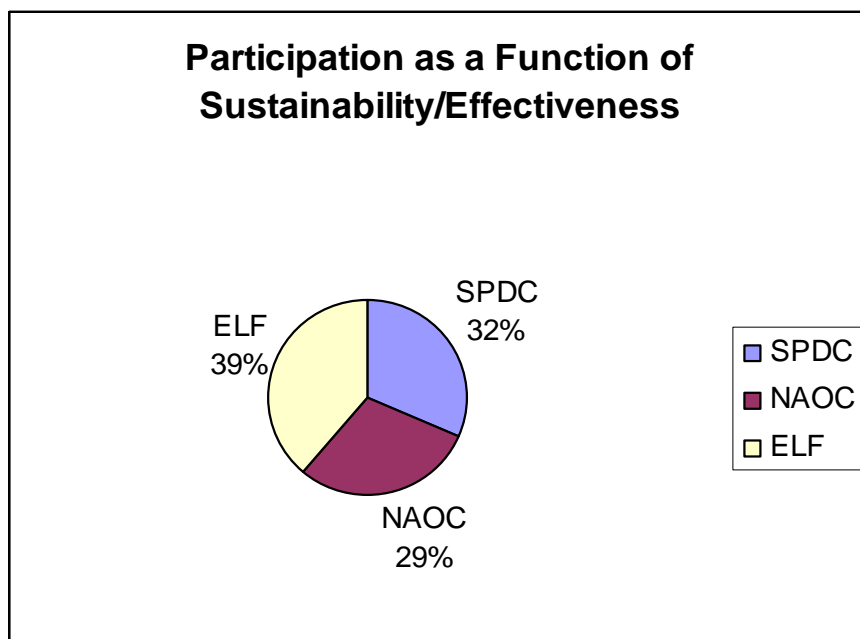Source: Field survey 2005

Fig. 2: Participation – Sustainability/Effectiveness as an index.

3.1a Participation as Sustainability Index

When pooled, the CSR programmes of the multinational corporations in the Niger Delta were unsustainable and therefore not effective having scored 43% (see table 4).

However, levels of sustainability and effectiveness results for TEPNG, SPDC and NAOC were 49%, 40% and 37% respectively. When viewed from the other angle of un-sustainability and ineffectiveness, SPDC topped the table with 47%, followed by NAOC with 46% and then TEPNG with 32%.

The reasons adduced to this result were based on participation strategies adopted by the competitors (multinational oil and gas industries) in the execution of CSR programmes in the Niger Delta region of Nigeria.

Prominent among these was the periodic three year clan-MOU engagement strategy adopted by TEPNG regardless any Oil and Gas activities in her host communities. It seemed to have won the hearts of its primary stakeholders (the communities) who were regarded as partners indeed. Again the use of appropriate development agents (Community Development Officers) who understood the subject matter of development may have increased the levels of understanding of development programmes by the TEPNG communities.

NAOC scarcely use MOU to plan CSR. However, it allowed National policies to guide its interest in CSR programmes. For instance, NAOC had developed skills acquisition programme for women in its operational areas to address gender mainstreaming issues in development.

The Green River agricultural extension project was a master piece that ensured food security. Jibowu (published) [3] pointed out that Green River Project played host to annual farmers' award days to reward farmers that had excelled in various areas of agriculture including bee-keeping and rekindled vibrancy among some laggards.

SPDC adopted community-GMOU strategy and only in areas of interest in any particular year. The completion of a particular Oil and Gas project in an area kept the communities' development interests a non-priority in the development plan of SPDC like Oloibiri and the pipeline communities. Such attitude of inconsistency in CSR programmes affected the relationship between SPDC and her operating communities in the Niger Delta and by implication other multinational oil and gas industries in Nigeria. Obviously, oil and gas commitments were usually affected with great consequence in the global energy prices as a result of market forces.

Considering the result of the Exponential function in Table 2, all the predictors (variables) were significant at various levels except $X8$ (availability of community development committee). Eight of the variables had direct relationship with sustainability at 5% significant level. These were awareness / enlightenment information source. It means communicating appropriate technology/information from the right channel caused oil and gas production

sustainable. It agreed with Nwachukwu (published) [4] that effective communication between the sender and receiver facilitates sustainability.

Operations and maintenance philosophy, Programme completeion conforms to the findings of Asiabaka (published) [5] Unamma, Onwudike, Uwaegbute, Edeoga and Nwosu (published) [6] that proliferation of abandoned CSR projects contributed to the current situation in the Nigerian Niger Delta. Impact on quality of life, stakeholders' engagement and CSR programmes execution method were also significant at 5%. Environmental unfriendliness and programme focus had negative relationship. This means that a CSR programme that lacks focus or that is environmentally unfriendly will not be sustainable.

However, the exponential function produced two of the variables as most significant at 1% (almost certain). These were methods of selecting CSR programmes to address Niger Delta communities felt needs and capacity development through provision of employment.

On the basis of statistical and econometric criteria of the value of R2, F-ratio and the number of variables significant, the signs and magnitude of the coefficient, the exponential function still gave the best regression fit.

The study churned out a participation model in the oil and gas industries christened "RACI model" which demonstrated that local participation in oil and gas activities directly or indirectly using a participatory scientific approach through responsibility, accountability, consultation and information (RACI) will provide the much desired license to operate needed for sustainable oil and gas production. It agrees with Guilt (published) [7], Chambers (published) [8], Jibowu (published) [9], Asiabaka (published) [10], Unamma, Onwudike, Uwaegbute, Edeoga and Nwosu (published) [11], that people oriented project management was spreading fast among the developing countries.

Secondly, capacity development through employment being also significant at 1% conforms to
a Priori expectation. One of the root causes of the Nigerian Niger Delta conflict that had sometimes paralyzed oil and gas production in the oil rich region of Nigeria was high density of youths' unemployment. The youths grouped themselves into various groups of Militants terrorizing oil and gas workers, government and individuals. They made themselves available to be used by politicians to settle political scores. This new wave of "business" had given birth to the ever increasing kidnapping, killings, extortions, bunkering and other types of criminalities going on in the Niger Delta presently.

According to Ogueri (unpublished) [12], these 2 variables that were significant at 1% could be used to predict sustainability of oil and gas production through CSR and were the main proponents of a model called "The Spider Model". The spider model is a development model used to navigate all odds in a socially harsh environment for oil and gas production (like in the Nigerian Niger Delta) in order to enhance sustainability. It can also be described as a sociological model of oil and gas production that contains elements capable of navigating all odds (faults) in an environment to ensure sustainability and stability. It was anchored on local participation (local content) especially in the choice of CSR programmes and capacity development through provision of employment opportunities for the impacted (directly or indirectly) host communities. This model advocates that local participation and capacity development through provision of employment sustain social license to operate for oil and gas industries thereby relatively stabilizing global energy availability and price.

Mathematically, Spider Model (SM) could be represented in an equation;

$$Y = f(a_1X_1 + a_2X_2 + a_3X_3 + a_4X_4 + a_5X_5 + a_6X_6 + a_7X_7 + ??+ a_9X_9 + a_{10}X_{10} + a_{11}X_{11} = X_5 + X_9 \text{-----(eqn 2)}$$

Where
Y = Sustainability of oil and gas production in a socially harsh environment
X_1 to X_{11} were as defined in eqn 1 of this study as indices of sustainability

$\bar{X}_5$ = Weighted mean of local participation (decision making) in oil and gas activities

$\bar{X}_9$ = Weighted mean of rural community capacity development through employment

The model had been deployed in the Niger Delta and could be assumed to anchor the premix upon which the amnesty programme for the Niger Delta militants was hinged by the Federal government of Nigeria.

The creation of the Niger Delta Ministry, Niger Delta Development Commission (NDDC), settlement packages and on-going capacity development / trainings for repented militants underscores the importance of spider model as it demonstrates its application.

IV. DISCUSSION AND RECOMMENDATIONS

4.1 DISCUSSION

Nigeria remains an important supplier of energy to the world. Stability in Nigerian oil and gas production and indeed in the sub-Sahara Africa will go along way in contributing to availability of global energy requirement. The raging wars of Iraq, nuclear tensions in Iran and confusions in the Middle East had affected availability of oil and gas to meet global energy demand. Market forces had led to instability in global energy price.

Be it as it may, un-interrupted production of oil and gas in Nigeria will, to a great extent guarantee supply to meet global energy requirement and by implication, relative price stability.

The study showed that a major factor to guarantee uninterrupted supply of oil and gas in the Nigerian environment is peace in the Niger Delta. It went further to reveal that peace in the Nigerian Niger Delta is a function of execution of sustainable corporate social responsibility programmes by the oil and gas industries.

The Federal Government of Nigeria had taken pragmatic steps towards addressing Niger Delta issues and Nigerian content. However, development in the region still remains unplanned as these important variables of sustainability that had significant levels of 1% and 5% had not been taken into consideration. This calls for concern as the relative peace enjoyed in the region remains very, very temporary.

The "Spider Model" of development as developed in this study where the two main variables significant at 1% were capable of ensuring sustainable social license to operate for the oil and gas industries in a difficult environment had not been championed. The variables, local participation especially in the methods of selecting CSR programmes and Capacity development through employment in Niger Delta will ensure social license to operate in the presence of appropriate technology.

The Spider Model is not limited to Nigerian Niger Delta region but could also be applicable to Venezuela, Columbia, Mexico, Angola, Democratic Republic of Congo, Yemen, to mention but a few. It is the state of development of the people and region that determines the application of the spider model.

Thus spider model could be assumed to be operational within the context of developing countries where poverty level is high.

This paper calls for the attention of technologically developed countries to put into practice, actions that will stabilize global energy price. The very sure way of achieving this is through advocacy for social license to operate for the oil and gas industries in the developing countries. Sustainable development should not be limited geographically.

The fluctuating global energy price calls for concern and should stimulate interests in the regions with potentials for energy supply, Nigeria and indeed Niger Delta region is key. The World should learn a lesson from the recent oil spill in the Gulf of Mexico which had terrorized Louisiana in the United States of America. The world is a global village and the adage "when the nose starts dropping liquid, the eyes start shading tears" should guide global thinking on the path of sustainable development.

4.2 Way Forward

This study could not be completed without recommendations on the way forward towards ensuring relative stability in global energy price based on the premix that price fluctuation was orchestrated by the forces of demand and supply. The recommendations were;

- The multinational oil and gas industries operating in the Nigerian Niger Delta environment should have joint strategy for CSR campaign as to compliment the efforts of government. The oil and gas industries competed among each other in the execution of CSR programmes thereby playing into the waiting hands of local communities especially the youths; hence conflict in the region was at the increase.

- Oil and gas industries should step up engagement of community stakeholders to enhance local participation through appropriate channels. Presently, Total Exploration and Production Company Nigeria Limited had developed a system of engaging the communities especially the youths transparently and periodically.

- Every major oil and gas project should be accompanied with a timely participatory rural sociological report before mobilization.

- A comprehensive participatory monitoring and evaluation strategy using a Logical frame work (Logframe) will form part of the projects' local content requirements.

- The oil and gas companies working in the Niger Delta should step-up efforts towards economic empowerment for self reliance and sustainability

- Managing oil and gas production in poverty stricken and harsh environment will have to take building the capacity and employment of the youths very seriously if global energy stabilization is important to the world.

- Participatory approach in CSR by oil and gas industries will go along way in ensuring

stable global energy availability, hence it should be advocated by developed countries

- A policy frame work should be developed around the "Spider model" of development for oil and gas industries operating in the developing countries that battle with poverty reduction like Mexico, Nigeria, Yemen, Angola, Venezuela, to mention a few.
- Spider model of development should be included as a requisite for value assurance review (VAR) for major oil and gas projects for a possible global energy price control.
- Finally, lack of capacity development / unemployment and deprivation of local participation in the oil and gas industries should be seen to have potentials to derail global energy price forecast. The developed countries should therefore demonstrate keen interests in sustainable development of the developing countries and entrench the indices of "spider model" as enablers of technical oil and gas packages for better delivery.

4.3. CONCLUSION

Conclusively, the demand for global energy is at the increase. However, supply had fluctuated due to distortions to commitments. The variables that caused the distortions revolve around local content issues of the CSR of the oil and gas activities in the developing countries like Nigeria.

By implication, the price of oil and gas in the world energy market will continue to be unstable if efforts are not geared towards curtailing militancy and other criminal vices in the Nigerian Niger Delta region. Therefore, corporate social responsibility programmes

are key in addressing these issues. Above all, the methods of selection, execution and creation of employment opportunities in the oil and gas industries will sustain global energy availability. The spider model of development should drive all CSR programmes of the oil and gas industries towards stabilizing energy price. Since the sustainability of global energy is a function of sustainable oil and gas production and an index of CSR programmes in the developing countries, it is advocated that developed countries (Canada, America, United Kingdom, etc) should demonstrate interests in CSR activities of the developing countries. By so doing, instability in the global energy market will relatively be checked.

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Acronyms:

CSR	Corporate Social Responsibility
FGD	Focused Group Discussion
SSI	Semi Structured Interview
SPDC	Shell Petroleum Development Company
TEPNG	Total Exploration and Production Nigeria Limited
NAOC	Nigerian Agip Oil Company
AFOD	Acceptability, Functionality, Operability and Durability
RACI	Responsibility, Accountability, Consultations and Information
SM	Spider Model
VARs	Value Assurance Review System